

REMARKS

The Final Office Action dated October 31, 2006, has been received and noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Initially, the Examiner is thanked for his review and consideration of this application and for withdrawing the finality of the Office Action mailed May 15, 2006.

In the detailed Office Action, claim 29 stands objected to because “signal filter” should be replaced by “prefilter”. In response, Applicants have amended claim 29, as shown above, and as suggested by the Examiner. Hence, the objection is now overcome.

Claims 21, 23-26, 28-30, 32-34, 36 and 38-42 stand rejected under 35 U.S.C. §102(e) as being anticipated by Zangi et al. (U.S. Patent No. 6,775,322 – hereinafter Zangi). The Examiner alleges that Zangi disclose all of Applicants’ claimed features. In response, Applicants respectfully traverse the rejection at least for the reasons provided below.

In the application of Zangi, the Examiner appears to have improperly mischaracterized the subject matter described and illustrated in Figs. 1 and 3 of Zangi.

According to Zangi, a method is disclosed for computing a coefficient of a finite impulse response pre-filter applied prior to a decision algorithm in an equalizer having adjustable filter coefficients. The filter may be used in a decision feedback sequence estimation (DFSE). According to Fig. 3 of Zangi, the equalizer 100 includes a pre-filter

102, a summer 106, a decision algorithm 108, a feedback filter 104, and a processor 120 which includes an adaptive algorithm 124 and a channel estimator 122.

With respect to the rejection of independent claim 21, in the paragraph bridging pages 3 and 4 of the detailed Office Action, the Examiner improperly equated Zangi's equalization filter 101 and decision unit 108 as Applicants' claimed decision feedback sequence estimator (DFSE).

Notably, in the same paragraph mentioned above, the Examiner immediately provided a different interpretation of Zangi and asserted that the decision unit 108 of Zangi is also "MLSE 108". That is, the decision unit 108 of Zangi is also allegedly equivalent to Applicants' claimed MLSE (e.g., MLSE 102 in Fig. 3 of the present invention), while the equalization unit 101 and the decision unit 108 of Zangi are equivalent to Applicants' DFSE (e.g., DFSE 58 in Fig. 3 of the present invention). Clearly, the Examiner's interpretation is incorrect in that the decision unit 108 of Zangi cannot be interpreted as simultaneously being two different features of Applicants' claimed invention.

Applicants respectfully assert that, whether the equalization filter 101 and the decision unit 108 of Zangi are equivalent to Applicant's claimed DFSE, whether the decision unit 108 is equivalent to Applicants' claimed MLSE, or whether the decision unit 108 is equivalent to both Applicants' DFSE and MLSE, the Examiner's assertions are incorrect because the cited features of Zangi are not structurally and functionally equivalent to Applicants' claimed features.

In other words, Zangi fails to disclose at least a decision feedback sequence estimator in communication with the signal optimizer, wherein the decision feedback sequence estimator comprises a prefilter, a summing element in communication with the prefilter, a feedback filter in communication with the signal optimizer and the summing element, and a maximum likelihood sequence estimator in communication with the summing element, as recited in independent claim 21 of the present invention.

Further, in traversing the anticipatory rejection of independent claim 21, Applicants respectfully remind the Examiner that the features disclosed in Fig. 3 of Zangi are directed to equalizer 100, and that equalizer 100 is a part of receiver 15, as shown in Fig. 1 of Zangi. As such, the Examiner's allegation that "the signal estimator 122" is in communication with the "signal filter" is inappropriate because Zangi actually discloses the "signal estimator 122" as a part of processor 120 in equalizer 100, which is actually in communication with sampler 18, as shown in Fig. 1 of Zangi. That is, in applying Zangi, the Examiner failed to consider Zangi in its entirety, and the Examiner improperly picked and chose features deemed relevant while ignoring the features pertinent to the intended function of the disclosed invention of Zangi.

Moreover, the Examiner's allegation that "signal optimizer 124" is in communication with the "signal filter" since it receives output from the "estimator 122 to calculate the coefficients" is insupportable because element 124 of Zangi is actually an adaptive algorithm that cooperates with the channel estimator 122 in the processor 120 of

the equalizer 100, as shown in Figs. 1 and 3 of Zangi which bear little similarity to those in Figs. 1, 2, and 3 of the present specification and of Applicants' claimed invention.

With respect to the anticipatory rejection of independent claim 32, the Examiner appears to assert that the pre-filter 102 of Zangi as equivalent to Applicants' prefilter 56, and Zangi's feedback filter 104 as equivalent to Applicants' feedback filter 92. In response, Applicants have amended independent claim 32, as shown above, to further recite the features of its dependent claim 35 so as to further clarify the claimed invention. Applicants note that the Examiner admitted that Zangi fails to teach the features recited in claim 35 as shown in Section 12, page 8, of the Office Action.

With respect to the anticipatory rejection of independent claim 38, Applicants have amended claim 38 to include all the features of its dependent claim 39 so as to further distinguish claim 38 over Zangi. Accordingly, claim 39 has been canceled and claim 40 has been amended to change its dependency from claim 39 to claim 38. Applicants respectfully assert that, by amending claim 38, the arguments set forth in relation to the rejection of independent claim 21 are also applicable to overcome the rejection of independent claim 38.

At least for the amendments and arguments set forth above in relation to independent claims 21, 32, and 38, the application of Zangi in the anticipatory rejection of their respective dependent claims 23-26, 28-30, 33-34, 36 and 39-42 is also insupportable.

Claims 27 and 37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Zangi and Taylor et al. (U.S. Patent Application Publication No. 2002/0197987 – hereinafter Taylor). In the rejection, the Examiner alleges that Zangi teaches every feature of the claimed invention but does not explicitly teach a deinterleaver in communication with an output of a MLSE and a depuncturer in communication with a deinterleaver and a channel decoder in communication with the deinterleaver. The Examiner cited Taylor as teaching the features lacked in Zangi and asserted that it would have been obvious to incorporate such a teaching in Zangi in order to recover the originally transmitted signal.

In response, Applicants respectfully traverse the obviousness rejection at least for the reasons set forth above in relation to the anticipatory rejection over Zangi.

Moreover, in view of the description provided in Zangi and Taylor, Applicants would point out to the Examiner that there is no motivation or suggestion to combine Taylor and Zangi. While the presently claimed invention is related to a Multiple-Input, Multiple-Output (MIMO) communication system, neither Taylor nor Zangi appears to be related to a MIMO communication system.

Further, in Section 11, on page 7 of the detailed Office Action, the Examiner asserted that the demodulator 56 of Taylor is equivalent to Applicants' MLSE. However, as shown in Fig. 3 of Taylor, the demodulator 56 is situated between receiver 54 and deinterleaver 58, and it appears that the demodulator 56 is simply for demodulating a

received signal and has no resemblance to Applicants' claimed maximum likelihood sequence estimator (i.e., MLSE 102 as shown in Fig. 3 of the present invention).

Still further, Applicants respectfully assert that neither Taylor nor Zangi teaches, discloses or suggests how or why their respective different inventions may be combined to arrive at Applicants' claimed invention to achieve an efficient way to process encoding and decoding scheme for a MIMO communication system.

Claims 31 and 35 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Zangi in view of Malkemes et al. (U.S. Patent Application Publication No. 2002/0106040 – hereinafter Malkemes). The Examiner asserted that Zangi fails to disclose a receiving station comprising a plurality of receive chains that correspond to a plurality of signal receiving antennas configured to receive and transmit a plurality of signal vectors to the plurality of receive chains. The Examiner then applied Malkemes as curing the deficiencies of Zangi.

In response, Applicants respectfully traverse the obviousness rejection, at least for the reasons set forth above, in relation to the anticipatory rejection over Zangi. With respect to the cancellation of claim 35, the rejection of claim 35 is rendered moot.

Further, Malkemes teaches a method and apparatus for reducing multipath distortion in a wireless LAN system with a plurality of antennae 102, and tuners 108 and 110 that provide received signals to a timing recover circuitry 112 and a spatial diversity combiner 150. However, Malkemes does not appear to teach, disclose or suggest a DFSE having the configuration as recited in claim 21 or a method having the steps recited in

claim 32. Hence, the combination of Malkemes and Zangi still does not arrive at Applicants' claimed invention as recited in claims 31 and 35.

Moreover, as Zangi does not teach, disclose or suggest a multiple-input and multiple-output communication system, the combination of Zangi and Malkemes is not proper without motivation or suggestion to combine the different teachings of Zangi and Malkemes to arrive at Applicants' invention.

In view of the arguments and amendments set forth above with respect to claims 27, 31, 35, and 37, Applicants respectfully request reconsideration and withdrawal of the pending obviousness rejections.

If for any reason the Examiner determines that the application, with claims 21-34, 36-38, and 40-42, is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicants' undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicants respectfully petition for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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